

## TITLE PAGE

**National Aquatic Animal Health Plan for the United States**  
Prepared by the  
**National Aquatic Animal Health Task Force**  
**Joint Subcommittee on Aquaculture**

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## ACKNOWLEDGMENTS

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## ACRONYMS

APHIS	Animal and Plant Health Inspection Service (USDA)
AVIC	Area Veterinarian-in-Charge (APHIS)
BMP	Best Management Practices
DOC	United States Department of Commerce
DOI	United States Department of Interior
EEZ	Exclusive Economic Zone
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FAO	Food and Agriculture Organization (United Nations)
FDA	United States Food and Drug Administration
FEC	Federal Executive Committee of the <i>Task Force</i>
FWS	United States Fish and Wildlife Service
JSA	Joint Sub-committee on Aquaculture
NAAHP	National Aquatic Animal Health Plan
NAAHTF	National Aquatic Animal Health Task Force ( <i>Task Force</i> ) on Aquaculture
NMFS	National Marine Fisheries Service (NOAA Fisheries)
NOAA	National Oceanic and Atmospheric Administration (DOC)
OIE	Office International of Epizootics
USDA	United States Department of Agriculture
WTO	World Trade Organization

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## EXECUTIVE SUMMARY

# **1. INTRODUCTION**

## **1.1 Mission statement**

The mission of the National Aquatic Animal Health Task Force (NAAHTF) on Aquaculture is to develop and implement a national aquatic animal health plan (NAAHP) for aquaculture in partnership and in cooperation with industry, regional organizations, State, local, and tribal governments, and other stakeholders, to:

- Facilitate the legal movement of all aquatic animals, their eggs, and products in interstate and international commerce;
- Protect the health and thereby improve the quality and productivity of farmed and wild aquatic animals;
- Ensure the availability of diagnostic, inspection and certification services; and
- Minimize the impacts of diseases when they occur in farmed or wild aquatic animals.

## **1.2 Rationale**

### **1.2.1 Aquaculture in the United States and the need for a national health plan**

The National Aquaculture Act of 1980 (Public Law 96-362, 94 Stat. 1198, 16 U.S.C. 2801, et seq.) defines aquaculture as “the propagation and rearing of aquatic animals in controlled or selected environments” including species of “finfish, mollusk, crustacean, or other aquatic invertebrate, amphibian, reptile, or aquatic plant.” Aquaculture is practiced throughout the United States and its territories by private, public, and Native tribal entities. This critical economic and environmental activity provides a source of wholesome and healthy food, employment, recreation, supplementation of wild fishery stocks for harvest by commercial and tribal harvesters, and protection and restoration of aquatic animals that face extinction due to a variety of causes. Aquaculture produces many other benefits, including medicines, education (public aquariums), and stress reduction/therapy (home aquariums) to name a few. While aquaculture has only grown significantly in the United States in the past 50 years, it has been practiced for hundreds of years in other parts of the world.

As the need for seafood grows world-wide, traditional capture of wild aquatic animals will not meet this growing demand. Already over 30% of the seafood consumed in the world is of aquaculture origin. It is projected that by the year 2030, over half of all seafood consumed will be from aquaculture (FAO. 2001. Aquaculture and inland fisheries fact sheet, FAO, Rome, 7pp) As more scientific evidence becomes available demonstrating the health benefits accrued from eating seafood, the demand for seafood is likely to grow even faster. Wild stocks are already overtaxed in many regions of the world and fisheries are reduced or closed. Meeting the demand of consumers will only be accomplished by a significant increase in output from aquaculture.

Many opportunities exist in the United States for safely increasing and sustaining aquaculture production. Perhaps most intriguing is the opportunity that exists in our offshore waters known as the exclusive economic zone (EEZ). This relatively untapped and vast marine area has great possibilities for meeting our seafood needs.

The United States has a vision to meet the challenge of supplying increasing amounts of seafood to its citizens. This vision is expressed in the Aquaculture Act of 1980 and in the National Aquaculture Development Plan (most recent draft dated 2000) created by the Federal interagency organization known as the Joint Subcommittee on Aquaculture (JSA). One of the challenges identified in the plan is the need to protect the health of our farmed and wild aquatic animals from the introduction of foreign animal diseases, reduce the proliferation and impact of diseases already existing in the United States, and be pro-active in developing and implementing programs of preventative medicine. Research and education are critical components of these goals. The plan states: "Without marked improvements in aquatic animal health management, U.S. aquaculture will not remain competitive in international markets." Perhaps more dire than not competing successfully in the world markets would be the introduction of diseases into the United States that could deplete or eliminate important existing farmed and wild stocks. Clearly, it is in the best interest of the United States to develop a comprehensive national aquatic animal health plan to protect its valuable resources.

Why is such a plan not already in place? There are many reasons. Historically, the Federal Government's effectiveness has been impaired by a fragmented, uncertain, and incomplete Federal regulatory framework, often characterized by disagreements among agencies with distinct roles and responsibilities in aquatic animal health. The Farm Bill of 2002 was helpful in resolving some disagreements as it defined the role of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA/APHIS) in the health management of farmed animals. While the Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries are responsible for the management of wild aquatic animals and the EEZ, interagency cooperation has been historically lacking in the development of plans that meet the needs of both farmed and wild animals.

Developing and implementing a national aquatic animal health plan has become urgent for two reasons: the growing need to protect our domestic commerce and resources, and the advent of new health regulations by foreign governments that restrict the import of live and processed aquatic animals from the United States.

The JSA has commissioned a national task force to construct a health plan for aquatic animals. The Federal agencies with primary responsibility for aquatic animal health (USDA, the Department of Commerce, and the Department of the Interior) are the leads on the Task Force. The first organizational meeting of the Task Force was held in Washington DC in 2001. The Task Force is chaired by USDA/APHIS (Dr. John Clifford) with co-chairs provided by FWS (Dr. Tom Bell) and NOAA Fisheries (Mr. E. Spencer Garrett). Four stakeholder meetings have occurred in the last 2 years in addition to the JSA's quarterly meetings. The purpose of the stakeholder meetings was to identify necessary components of the plan and a process for plan development.

This document captures feedback received from our stakeholders and other Federal partners of JSA as to what a national plan for aquatic animals should provide. As this plan is developed, reviewed, pilot tested, and implemented, there is an expectation by the Task Force that the process will be dynamic, interactive, and transparent with the goal of achieving our mission and

providing for the health and safety of our farmed and wild aquatic resources.

### 1.2.2 Economic value of aquaculture in the United States

Aquaculture is a rapidly expanding economic activity in the United States. It is estimated that production of farmed aquatic animals more than doubled from approximately 400 million pounds in 1985 to 987 million pounds in 1999, with a farm-gate value in 1999 of \$842 million (NMFS, 2001. Fisheries of the United States, DOC/NOAA/NMFS, August 2001). In 1992, aquaculture provided for 181,000 jobs nation-wide and a total annual economic value of \$5.6 billion (Dicks et al 1992). The jobs and economic value for farmed fish has grown substantially since 1992 as indicated by the statistics above. This economic estimate for farmed fish does not take into account the total economic value of recreational fishery, which is estimated to be over \$30 billion annually --a large portion of which is a direct result of aquaculture production at public, tribal, and private hatcheries (DOI & DOC, Oct. 2002. National Survey of Fishing, Hunting and Wildlife Recreation).

A better understanding of the influence of aquaculture on national and local economies can be made if the data is presented in a more detailed fashion. Table 1 provides an estimate of the volume and farm-gate value of selected species. Since the publication of this data, new pilot offshore production programs have been started. The value of ornamental species in Florida is significant as noted in Table 1. However, many other ornamental propagation programs exist throughout the United States for which statistics are not available. Based on production figures that were obtained in 1999 and new operations that have come on line not accounted for, it is likely the data in Table 1 underestimates the total national production of farmed aquatic animals by 10 to 20 percent.

Table 1. Production and farm gate value of selected farmed aquatic animals in 2002  
(Sources: Western Regional Aquaculture Center; California, Maine, Washington; DOC/NOAA.)

Species farmed	Lbs. x 1,000	Farm gate value (\$)
Baitfish*	11,600	\$39,000,000
Catfish	630,000	\$358,000,000
Hybrid bass	10,490	\$31,000,000
Salmon	17,743	\$57,700,000
Tilapia	18,000	\$24,300,000
Trout	54,451	\$70,000,000
Tropical Fish **	unknown	\$143,643,142
Shrimp	4,217	\$12,188,000
Mollusks***	101,694	\$86,270,000
<b>TOTAL</b>	<b>848,195</b>	<b>\$822,101,142</b>

\* Baitfish is for 1998    \*\* For Florida only

\*\*\* West coast only

Often overlooked in assessing the value of aquaculture is its contribution to wild fishery. In the Western United States, hatchery production is key to providing opportunity to commercial harvesters. This point is well illustrated in Table 2. In Alaska, hatcheries operated by the State and private, non-profit fisher cooperatives (PNP's) provide a significant amount of salmon.

While in some areas harvest is primarily of wild origin, in other areas --particularly terminal fisheries operated by PNP's-- virtually all the salmon harvested originated from their aquaculture operations. In States such as California, Oregon, and Washington, where many stocks of salmon are listed as threatened or endangered under the Endangered Species Act, harvest opportunities for commercial harvesters would not exist were it not for hatchery releases.

Table 2: Estimated economic value of cultured Pacific salmon harvested by commercial fishers in the United States in 2000. (All numbers in thousands. Data sources- PSMFC Review 2002; Alaska Salmon Enhancement Report, ADFG, March, 2003)

State	Total No. Harvested	Est. # of Hatchery Origin	Ex-vessel value	Income Impact*
AK	137,163	29,794	59,699	Unknown
WA	1,534	825	4,278	\$301
OR**	148	104	2,145	\$4,600
CA**	479	335	7,212	\$15,892
<b>Total</b>	<b>139,324</b>	<b>31,058</b>	<b>73,334</b>	<b>\$20,793</b>

\* Income impacts (\$), in 2002 dollars, are per lb. per day estimates of income impacts provided from output of the Fishery Economic Assessment Model (FEAM) for commercial ocean troll fisheries for cultured Chinook and Coho salmon only. Data not available for AK and reflects only ocean troll fishery in WA.

\*\* Harvested number of salmon in OR and CA are ocean troll caught only, 98% of which are Chinook salmon in 2000.

Table 3 provides an estimate of the economic value of recreational salmon fishery in the Western United States. The economic value for this one type of recreational fishery in one region in the year 2001 is over \$625 million. In the past 2 years, 2002-2003, survival to adulthood of some species of salmon, particularly Chinook salmon, has been at historical highs. The result of these high survivals has been an increase in harvest opportunities, which in turn translates to an even higher economic impact than those listed in Table 3. As with commercial salmon harvesting, recreational salmon fishing would not exist in most States were it not for hatchery production.

Table 3: Estimated economic value of recreational salmon fishery in U.S. Pacific region 2001. (All numbers in thousands. Source: 2001 U.S. National Fishing and Hunting Survey, DOI/DOC; PSMFC annual reports)

State	Total Angler Fishing Days*	Est. # of Hatchery Origin	Ex-vessel value	Income Impact*
AK	3,641	2,509	\$370,774	\$80,538
WA	12,741	5,065	\$339,400	\$179,882
OR	8,848	2,756	\$187,444	\$131,210
CA	27,730	4,568	\$334,335	\$234,034
<b>Total</b>	<b>52,960</b>	<b>14,898</b>	<b>\$1,231,953</b>	<b>\$625,664</b>

\*Population is anglers 16 years and older

\*\*Economic value of recreational salmon fishery is based on proportion of wild to enhanced catch in commercial fishery.

The total value of recreational fishing in the United States is estimated to exceed \$30 billion annually. Of that expenditure, over \$21 billion is for freshwater fishing (2001 National Survey of FWS. 2002). It is difficult to determine the total portion that is a result of aquaculture production, but it is substantial. In most States, consumptive harvest of trout is a direct result of hatcheries. The southeastern region of the United States is an area one does not typically think of as a freshwater trout fishing area. Yet, this activity is very important to the economy. A report published by the FWS in 1999 (Trout Fishing in the U.S., FWS) identifies the scope of this activity in 1996 in the Southeast United States. The related data is provided in Table 4.

Table 4. Annual economic effects as a result of trout production at national fish hatcheries in Southeast United States. (All numbers in thousands.)

Hatchery Name	Annual Trout Angler Days	Total Economic Effects	Fed. & State Tax Revenue	Annual Hatchery Budgets
Dale Hollow, TN	698	\$57,269	\$2,722	\$526
Chatahoochee, GA	360	\$30,416	\$1,532	\$262
Wolf Creek, KY	445	\$40,029	\$2,236	\$285
Norfolk, AR	1,306	\$91,162	\$4,069	\$694
Greer Ferry, AR	648	\$45,723	\$2,025	\$346
<b>Total</b>	<b>3,457</b>	<b>\$264,599</b>	<b>\$12,584</b>	<b>\$2,113</b>

Nationwide, an estimated 83 million trout angler days occur annually, a significant portion of which is a result of cultured fish.

While we've demonstrated the economic value of aquaculture based on production of aquatic animals for food and harvest by commercial and recreational fishers, many other benefits are provided by aquaculture that are difficult or impossible to measure. For example, how does one put a value on the restoration and rehabilitation of an aquatic animal that is on the brink of

extinction --an animal that may not now or ever be consumptively harvested? How does one estimate the value of a family spending a relaxing vacation together in pursuit of a wily trout, salmon, bass, or catfish? What is the value of watching tropical fish in the home aquarium for a person who is an invalid? A dollar value cannot be placed on these activities - all of which are a result of aquaculture in the United States.

### **1.2.3 Impact of infectious diseases on aquaculture**

The case is easily made that aquaculture is of great importance to the United States. It is also easy to identify the many threats to aquaculture's success. Perhaps the most significant threat is that of disease. Infectious diseases can cause significant losses to aquatic animals, both farmed and wild, in all stages of their life history. The consequences of disease outbreaks are many, ranging from a decreased productivity of an aquatic farm to requiring the complete eradication of an infected population. In the past 2 years alone, outbreaks of infectious salmon anemia (ISA) and spring viremia of carp (SVC) in private U.S. aquaculture operations have resulted in losses of over \$10 million (APHIS). These losses, while large, pale in comparison to the annual global losses in shrimp aquaculture due to white spot shrimp virus disease (WSSV). In recent years, losses have been estimated to be as high as \$3 billion (Subasinghe et al., 2001 - Subasinghe, Bondad-Reantaso, and McGladdery. 2001. Technical Proceedings of the Conference on Aquaculture in the Third Millennium. 20-25 February, 2000. Bangkok, Thailand).

Many examples exist of infectious diseases invading public hatcheries, resulting in the destruction of all stocks of fish at the infected facility (Amos et al, 2001. Risk analysis in aquatic animal health. Proceedings of an OIE conference. Paris, France.) When aquatic animals are destroyed at a public facility, the economic losses can be measured not only in the amount invested in the animals at time of destruction, but also in the never-to-be-realized economic contribution to the fishery, including commercial or recreational harvest.

Disease outbreaks can result in significant economic loss even if few animals die during the disease event. As a trading partner in the global economy, live and processed seafood products are exported from all locales in the United States daily. If certain disease agents are discovered in the United States, international commerce in certain aquatic animals could be restricted or eliminated. The same restrictions can apply for domestic commerce. It is crucial for the United States to maintain its health status to keep the lines of trade open. The current value of seafood exports is estimated to be \$11 billion (Fisheries Statistics for the U.S., 2001. DOC/NOAA/NFS). While the United States currently has an approximately \$7 billion annual deficit in international seafood trade, our goal is to reduce that deficit. This can only be accomplished by protecting our current health status.

### **1.3 Expected outcomes**

Many tangible outcomes will result from the development and implementation of a national aquatic animal health plan (NAAHP). They include the following:

Aquaculture as it exists today will continue to be a viable activity in the United States;

Our nation's farmed and wild aquatic resources will be protected from the unwanted introduction or spread of devastating infectious diseases;

The United States will be in a position to continue trading with its international partners; and

The United States will be able to meet its national and international legal obligations.

### **1.3.1 Enable aquaculture to continue to be a viable business activity.**

To be competitive with foreign producers and maintain production costs that will allow an aquaculture endeavor to be profitable, farmers must be able to continue to improve efficiency of production and health of their animals. This can be achieved by the implementation of the NAAHP, which will meet the needs of producers by providing a variety of benefits, including:

Comprehensive disease prevention, diagnosis, and treatment programs;

Research to prevent and/or treat disease outbreaks;

Training to provide a cadre of health professionals to service private operations; and

An outreach and awareness program to make the public aware that measures are in place to ensure the safety of seafood and the protection of natural resources.

### **1.3.2 Protect cultured and wild resources**

While the movement of live aquatic products domestically and internationally is critical for the economic success of aquaculture, it is equally important that such activities not jeopardize the health and welfare of existing farmed and wild fisheries stocks. One of the primary objectives of the NAAHP is to identify the elements of a health management plan that will provide for the protection of wild and cultured resources while enabling effective and efficient aquaculture.

### **1.3.3 Provide efficient and effective intra and international commerce**

One of the obstacles for movement of live aquaculture products intra and internationally is the concern that infectious diseases will be introduced or spread into new areas. Currently, there does not exist a universally recognized and easily understood State/Federal aquatic animal health program to ensure the safe movements of these animals in an efficient and predictable manner. The NAAHP will create the framework for ensuring the safe movement of aquatic animals, thus providing the means to ensure safe, efficient and predictable commerce.

### **1.3.4 Enable U.S. to meet national and international legal obligations**

Companies conducting international commerce with live aquatic animals (that is, companies that engage in export) are required to meet the requirements of the importing country. The United States currently does not have an infrastructure established that meets all the requirements of our trading partners. Likewise, programs necessary to limit or prevent inappropriate imports of high risk animals into the United States are not in place. Further, intra-national rules of commerce in the United States do not meet our obligations under the World Trade Organization (WTO). The NAAHP will address these issues and will bring the United States into compliance with policies of the Office International des Epizooties (OIE), rules of other countries including those in the European Union (EU), and the rules and policies under the North American Free Trade Agreement (NAFTA) and WTO.



## **1.4 Guiding principles**

### **1.4.1 Purpose**

The purpose of the NAAHP's "Guiding Principles" section is to establish the standards by which the elements of the NAAHP have been developed. Contributing to the guiding principles is information from the following sources: OIE Code (2002); "A business case in support of a national aquatic animal health program" (DFO, Canada. 2002); "Salmonid disease control policy of the fisheries co-managers of Washington State" (WDFW, 1998); and, "Manual of procedures for the implementation of the Asia regional technical guidelines on health management for the responsible movement of live aquatic animals" (FAO/NACA, 2001).

### **1.4.2 Science based**

The elements of the NAAHP are constructed using established scientific principles of fish health management. To the degree possible, the latest scientific research and publications were incorporated into this document. Stakeholder groups composed of scientific experts, such as the American Veterinary Medical Association, the American Fisheries Society, and government management agencies, have reviewed and commented on this document. These reviews were conducted under the highest level of scientific scrutiny and professionalism.

### **1.4.3 Enabling effective and efficient commerce**

The intra and inter-national movement of live aquatic animals is essential if aquaculture is to successfully occur in the United States. However, if the movement of products is inefficient and burdened with ineffective and unjustifiable bureaucratic processes, then aquaculture in the United States will not be viable. The intent of the NAAHP is to enable safe, seamless and efficient commerce.

### **1.4.4 Transparent and collaborative process**

The development of the NAAHP must be an open and visible process in which stakeholders have the opportunity for input. Further, it is a necessity that participants in the process represent a broad range of interests from the aquaculturists (private, Federal, State, and tribal) who own and operate aquaculture facilities to the government and tribal entities that regulate aquaculture. By holding stakeholder workshops and broadly distributing reports during the development of the plan the NAAHP will be developed in a transparent and collaborative manner.

### **1.4.5 Protect cultured and wild fisheries resources**

A primary mission of the Task Force is to protect and manage the aquatic animal resources of the United States. Federal agencies have stewardship responsibilities for cultured and wild species alike. While a primary objective of the NAAHP is to enable the continued development of aquaculture in the United States, this commerce will not be viable if a significant risk to resources is already present.

### **1.4.6 Essential, logical, and feasible**

Limited resources are available to manage the health of our nation's aquatic animal resources. Considering these limited resources, it is the intent of the Task Force to create a program that will allow safe and productive aquaculture, yet include only the essential elements for success. In addition to being affordable, the plan must make sense to stakeholders and be capable of implementation. If the NAAHP does not make logical sense or is too onerous or complicated, it

will not achieve its goal of enabling safe, effective, and efficient aquaculture in the United States.

#### **1.4.7 Consistent with international standards**

Trade with our partners in North America, not to mention the rest of the world, is at risk of being curtailed because of the absence of guidelines and rules for the management of fish diseases and pathogens. Foreign countries with disease control programs in place, such as members of the EU, have little interest in receiving live aquatic animals if they will jeopardize the health and trading status of aquatic animals already in their respective countries. The aquatic animal health standards of the United States must be brought into line with the rest of the world. The standards proposed in this document are consistent with WTO and OIE standards and, to the extent possible, consistent with Federal, State, and tribal regulations already in existence in the United States.

#### **1.4.8 Use the principles of trade risk analysis in assessing transfers of live aquatic animals.**

The transfer of live aquatic animals and their gametes may involve a degree of risk, since pathogen transfer from the exporting zone to the receiving zone may occur. The aim of trade risk analysis is to provide an objective and science-based method for evaluating the disease risks associated with the movement of product. This analysis must be conducted in a transparent fashion so that the exporting country/zone clearly understands the concerns of the importing country/zone, and the difference between scientific facts and subjective opinion is clearly delineated.

Trade risk analysis is preferable to a zero-risk approach because it encourages a more objective decision-making process and provides opportunity for relevant regulatory entities to discuss the proposed transfers in a transparent fashion. It continues to be the right of any managing entity to accept or reject the import of live aquatic animals into its management area (Appropriate level of protection - SPS Agreement of WTO). However, when an entity rejects an import, it must be prepared to justify that decision. This standard applies not only to international trade but also to inter and intra-State commerce.

### **1.5 Process for developing a National Aquatic Animal Health Plan**

The process for developing the NAAHP is described in the document titled: “Development of a National Aquatic Animal Health Plan” as approved by the FEC of the *Task Force* (Appendix A).